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BIOLOGICAL SURVEY OF ANTIETAM CREEK AND SOME OF ITS TRIBUTARIES, FROM WAYNESBORO, PENNSYLVANIA TO ANTIETAM, MARYLAND. POTOMAC RIVER BASIN

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I. INTRODUCTION

A biological survey of Antietam Creek and some of its tributaries in the reach between Waynesboro, Pennsylvania, and Antietam, Maryland, was conducted between July 19 and July 21, 1966. The biological activities were conducted concurrently with stream quality investigations.

For purposes of the study, the community of bottom (benthic) organisms was selected as the indicator of the biological condition of the stream. Bottom organisms serve as the preferred food source for the higher aquatic forms and exhibit similar reactions to adverse stream conditions. The combination of limited locomotion and life cycles of one year or more, for most benthic species, provides a long-term picture of the water quality of a stream. Fish and algal populations were given some consideration, but only to the extent that obvious conclusions could be drawn based upon casual observations.

In unpolluted streams, a wide variety of sensitive clean-water associated bottom organisms is normally found. Typical groups are stoneflies, mayflies, and caddisflies. These sensitive organisms usually are not individually abundant because of natural predation and competition for food and space; however, the total count or number of organisms at a given station may be high because of the number of different varieties present.

Sensitive genera (kinds) tend to be eliminated by adverse environmental conditions (chemical, physical, and biological)

resulting from wastes reaching the stream. In waters enriched with organic wastes, comparatively fewer kinds are normally found, but great numbers of these genera may be present. Organic pollution-tolerant forms such as sludgeworms, rattailed maggots, certain species of bloodworms such as red midges, certain leeches, and some species of air-breathing snails may multiply and become abundant because of a favorable habitat and food supply. These organic pollution-tolerant bottom organisms may also exist in the natural environment but are generally found in small numbers. The abundance of these forms in streams heavily polluted with organics is due to their physiological and morphological abilities to survive environmental conditions more adverse than that tolerated by other bottom organisms. When inert silts or organic sludges blanket the stream bottom, the natural home of bottom organisms is destroyed, causing a reduction in the number of kinds of organisms present.

In addition to sensitive and pollution-tolerant forms, some bottom organisms may be termed intermediates, in that they are capable of living in fairly heavily polluted areas as well as in clean-water situations. These organisms occurring in limited numbers, therefore, cannot serve as effective indicators of water quality.

Streams grossly polluted with toxic wastes such as mine drainage will support little, if any, biological life and will reduce the population of both sensitive and pollution-tolerant organisms.

Classification of organisms in this report is considered in three categories (clean-water associated, intermediate, and pollution-tolerant) which provide sufficient biological information to supplement physical and chemical water quality data for a basin-wide analysis. Detailed identification and counts of specific organisms have been tabulated and attached.

II. SUMMARY AND CONCLUSIONS

1. A biological survey of Antietam Creek and some of the tributaries in the reach between Waynesboro, Pennsylvania, and Antietam, Maryland, was conducted between July 19 and July 21, 1966. The biological activities were conducted concurrently with stream quality investigations.

2. Bottom organisms were selected as the primary indicator of biological water quality.

3. Fair biological conditions were indicated on the West Branch of Antietam Creek upstream from Waynesboro, Pennsylvania.

4. Mild pollution on Antietam Creek was indicated between Millers Church Road near Rocky Forge, Maryland, and Antietam Drive east of Hagerstown, Maryland.

5. Moderately heavy organic pollution on Antietam Creek was found at the west edge of Funkstown, Maryland (Station 7).

6. Mild organic pollution was indicated in Antietam Creek from the Poffenberger Road Bridge (Station 8) downstream to Burnside Bridge near Sharpsburg, Maryland (Station 12).

7. Good water quality was indicated at Antietam, Maryland, and unpolluted water was contributed to the Potomac River by Antietam Creek.

8. Marsh Run, Beaver Creek, and Little Antietam Creek (Station 11) were found to contribute good water quality to Antietam Creek.

III. DATA EVALUATION AND INTERPRETATION

Antietam Creek is a small, shallow creek, with the West Branch of the Creek originating in south-central Pennsylvania north of Waynesboro. The principal Cities in the drainage area are Waynesboro, Pennsylvania, and Hagerstown, Maryland.

The main points of degradation were also found downstream from Waynesboro and Hagerstown.

Control stations were sampled on the tributaries of Marsh Run, Beaver Creek and Little Antietam Creek at Keedysville, Maryland.

Sampling stations were located after consideration of the following conditions:

1. Effects of tributaries
2. Areas having a known water quality problem
3. Physical capability for sampling

Bottom organisms are animals that live directly in association with the bottom of a waterway. They may crawl on, burrow in, or attach themselves to the bottom. Macroorganisms are usually defined as those organisms that will be retained by a No. 30 sieve. In essence, the organisms retained by the sieve are those that are visible to the unaided eye.

Each station was sampled once, and the kinds of macro bottom organisms were observed for the purpose of evaluating water quality. Quantitative bottom samples were also taken, using a Surber Square Foot Sampler, and the number of organisms per square foot was counted.

Quantitative samples were not taken at stations in non-critical areas or where organisms were sparsely distributed.

Discussions of stations proceed downstream unless otherwise noted.

Station #1 - West Branch Antietam Creek off Pennsylvania Route 316 upstream from Waynesboro, Pennsylvania

The water was very clear, and minnows were extremely abundant. Darters, a small fish related to yellow perch and walleyes, were also observed. A total of only eight genera of bottom organisms was found, including such clean-water forms as caddisflies and riffle beetles. Intermediate organisms included flatworms, sow-bugs, and midge larvae. Pollution-tolerant forms included leeches and two genera of air-breathing snails. Soil erosion is heavy to moderate, and the surrounding land is in intensive agriculture. This limits the number of kinds of bottom organisms present. Fair biological conditions are indicated at this location.

Station #2 - Antietam Creek at Millers Church Road near Rocky Forge, Maryland

The water was very clear, and submerged aquatic vegetation was fairly abundant. Silt deposits were heavy in some areas, and a hydrogen sulfide odor was noted when the bottom was disturbed. Only 11 genera of bottom organisms were found. Clean-water forms consisted of one gill-breathing snail. Pollution-tolerant forms included sludgeworms, leeches (3 genera), and air-breathing snails (2 genera). Intermediate forms such as flatworms, scuds, blackflies,

and midges made up the balance. Out of 1,501 bottom organisms in the square-foot sample, there were 1,368 blackflies, 96 intermediate midge larvae, 36 air-breathing snails, and one leech. Mild pollution is suggested at this station.

Station #3 - Antietam Creek at the Old Forge Road Bridge upstream from Hagerstown, Maryland

Only 14 genera of bottom organisms were found, but some biological improvement was indicated by the presence of such clean-water representatives as caddisflies (2 genera) and riffle beetles. Intermediate forms such as scuds, sow-bugs, flatworms, blackflies, and intermediate midge larvae were sampled. Pollution-tolerant forms such as sludgeworms, bristleworms, air-breathing snails (2 genera), and leeches were also found. The quantitative sample contained 1,102 bottom organisms which consisted of 523 caddisflies, 356 intermediate midge larvae, 86 air-breathing snails, 63 scuds, 21 sludgeworms, 13 riffle beetles, 11 blackflies, ten flatworms, ten bristleworms, and nine sow-bugs. The water was clear, and heavy growths of submerged aquatic vegetation and duckweed were present. Mild biological degradation was indicated at this station.

Station #4 - Antietam Creek at Trovinger Road due north of Bridgeport, Maryland

The water was clear, and there was a heavy growth of submerged aquatic vegetation and duckweed, suggesting an abundance of nitrogen and phosphorus. Silt deposits are moderately heavy in some areas. Only four genera of bottom organisms were found versus

14 at the upstream station. They consisted of the intermediate scuds (2 genera) and flatworms and a pollution-tolerant air-breathing snail. Mild pollution was indicated at this station. Something appears to be restricting the diversification and productivity of the bottom organisms.

Station #5 - Mouth of Marsh Run (a tributary to Antietam Creek) at the east edge of Hagerstown at Security, Maryland

The water was clear; and fourteen genera of bottom organisms were found, including such clean-water representatives as mayflies (2 genera), caddisflies (2 genera), and riffle beetles. The square-foot sample consisted of 312 intermediate midge larvae, 216 caddis-fly larvae, 104 riffle beetles, 80 sow-bugs, 16 sludgeworms, seven crayfish, and eight mayflies. Clean-water forms made up 44 per cent of the quantitative sample. Good water quality was contributed to Antietam Creek.

Station #6 - Antietam Creek at Antietam Drive east of Hagerstown, Maryland

The water was clear; and numerous minnows, goldfish, and tadpoles were observed. Eleven genera of bottom organisms were found which included such clean-water organisms as mayflies, caddis-flies, and riffle beetles. Intermediate organisms consisted of fingernail clams, scuds, and intermediate midge larvae. Pollution-tolerant organisms included sludgeworms, air-breathing snails (3 genera), and a fly larvae. Productivity at this station was sur-prisingly low, and only 36 bottom organisms were found in the

square-foot sample. The quantitative sample consisted of 15 intermediate midge larvae, 11 air-breathing snails, seven sludgeworms, two caddisflies, and one fly larva. Mild pollution was indicated at this station.

Station #7 - Antietam Creek at the bridge on East Oak Ridge Road at the west edge of Funkstown, Maryland

The water was slightly cloudy and very foamy, believed to be caused by discharge of detergents. This station is located downstream from the Hagerstown Sewage Treatment Plant. Sewage mold was present on the rocks. This is believed to be Sphaerotilus sp. Only six genera of bottom organisms were found at this location. They consisted of pollution-tolerant sludgeworms, air-breathing snails, and cranefly larvae. Intermediate organisms were damselflies and intermediate midge larvae (2 genera). The square-foot sample consisted of 1,824 sludgeworms, 1,224 intermediate midge larvae, 256 cranefly larvae, and 112 air-breathing snails. Moderately heavy organic pollution was indicated.

Station #8 - Antietam Creek at Poffenberger Road Bridge downstream from Funkstown, Maryland

Foam was still present, and the water was slightly cloudy. A mild sewage odor was evident. A very large goldfish and tadpole population was observed, and goldfish and tadpoles were easily collected in the qualitative sample. Only seven genera of bottom organisms were found, consisting of the following pollution-tolerant forms: leeches, air-breathing snails (2 genera), and a bristleworm;

and the balance was made up of intermediate forms: damselflies, flatworms, and midge larvae. The 394 bottom organisms in the square-foot sample consisted of 248 intermediate midge larvae, 88 air-breathing snails, 40 leeches, ten bristleworms, and eight flatworms. Mild organic pollution was indicated at this station.

Station #9 - Antietam Creek at the Devils Backbone County Park adjacent to Maryland Route 68

The water was clear, and small black bullheads, minnows, and a large goldfish population were observed. A total of 16 genera of bottom organisms was found versus only seven at the upstream station; however, only 56 organisms per square foot were sampled in the quantitative sample. Clean-water forms consisted of caddisflies and gill-breathing snails. Intermediate forms consisted of flatworms, blackflies, midge larvae (3 genera), damselflies, and fingernail clams. Pollution-tolerant forms were leeches (2 genera), air-breathing snails (4 genera), and sludgeworms. The quantitative sample consisted of 30 gill-breathing snails, 19 air-breathing snails, four caddisflies, one sludgeworm, one leech, and one intermediate midge larvae. Recovery was starting to take place but had not yet occurred.

Station #10 - Beaver Creek (tributary to Antietam Creek) near its mouth off Maryland Route 68 near Breathedsville, Maryland

The water was very cloudy due to soil erosion from upstream. This is believed to be from road construction. However, an excellent

bottom organism population consisting of 24 genera was found. It consisted of such clean-water forms as stoneflies, mayflies (6 genera), caddisflies (4 genera), riffle beetles (2 genera), fish flies, and gill-breathing snails. There were 324 organisms in the square-foot sample consisting of 134 gill-breathing snails, 67 riffle beetles, 57 intermediate midge larvae, 29 caddisflies, 22 sludgeworms, nine mayflies, four scuds, and two smoky alderfly larvae. Excellent water quality was contributed to Antietam Creek.

Station #11 - Little Antietam Creek (tributary to Antietam Creek) at the bridge downstream from Keedysville, Maryland, and west of Route 34

Submerged aquatic weeds were very abundant, and the water was extremely clear. Numerous minnows were observed at this location. High water quality was indicated by the 27 genera of bottom organisms which included such clean-water forms as stoneflies, mayflies (4 genera), caddisflies (3 genera), fishflies, gill-breathing snails, and riffle beetles (2 genera). A total of 1,458 bottom organisms was found in the square-foot sample. It consisted of 968 caddisflies, 264 riffle beetles, 102 intermediate midges, 40 cranefly larvae, 32 sow-bugs, 19 small crayfish, 11 mayflies, eight flatworms, six scuds, and five fishflies. Excellent water quality was contributed to Antietam Creek.

Station #12 - Antietam Creek at Burnside Bridge near Sharpsburg, Maryland

The water was slightly cloudy, and there appeared to be quite a bit of silt coming down from upstream. This was believed to be from road construction. Fourteen genera of bottom organisms were found which included clean-water forms such as caddisflies, riffle beetles, and gill-breathing snails. Intermediate forms consisted of flatworms, fingernail clams, damselflies, scuds, and midges. Pollution-tolerant forms included air-breathing snails (2 genera), sludgeworms, and leeches. However, bottom organisms were not very abundant and only 15 per square foot were taken in the quantitative sample. It consisted of 12 midge larvae, one riffle beetle, one scud, and one sludgeworm. Mildly degraded biological conditions were still indicated at this station.

Station #13 - Antietam Creek at the bridge at the Village of Antietam, Maryland

The stream was clear, and numerous bullheads and darters were observed. Submerged aquatic vegetation and filamentous algae were heavy. Good biological conditions were indicated by the 22 genera of bottom organisms which included such clean-water forms as mayflies (3 genera), caddisflies (2 genera), riffle beetles (2 genera), and gill-breathing snails (2 genera). A total of 713 bottom organisms was collected in the square-foot sample which consisted of 440 intermediate midge larvae, 200 caddisflies, 40 mayflies, 19 gill-breathing snails, eight riffle beetles, three leeches, one air-breathing snail, one flatworm, and one bristleworm. High water quality was contributed to the Potomac River by Antietam Creek.

TABLE I

BOTTOM ORGANISM DATA OF
ANTIETAM CREEK AND TRIBUTARIES

Station Number	Location	Bottom Organisms			Indicated Water Quality
		No. of Kinds	No. Per Sq. Ft.	Dominant Forms	
1	West Branch of Antietam Creek off Pennsylvania Route 316 upstream from Waynesboro, Pennsylvania	8	Not Taken	Flatworms Sow-bugs Midge Larvae	Fair
2	Antietam Creek at Millers Church Road near Rocky Forge, Maryland	11	1,501	Blackflies	Mild Pollution
3	Antietam Creek at the Old Forge Road Bridge upstream from Hagerstown, Maryland	14	1,102	Caddisflies Midge Larvae	Mild Pollution
4	Antietam Creek at Trovinger Road due north of Bridgeport, Maryland	4	Not Taken	Scuds Flatworms Air-breathing Snail	Mild Pollution
5	Mouth of Marsh Run (a tributary to Antietam Creek) at the east edge of Hagerstown at Security, Maryland	14	743	Midge Larvae Caddisflies Riffle Beetles Sow-bugs	Good
6	Antietam Creek at Antietam Drive east of Hagerstown, Maryland	11	36	Midge Larvae Air-breathing Snails Sludgeworms	Mild Pollution
7	Antietam Creek at the bridge on East Oak Ridge Road at the west edge of Funkstown, Maryland	6	3,416	Sludgeworms Midge Larvae	Moderately Heavy Pollution
8	Antietam Creek at Poffenberger Road Bridge downstream from Funkstown, Maryland	7	394	Midge Larvae Air-breathing Snails Leeches	Mild Pollution

TABLE I (Continued)

Station Number	Location	Bottom Organisms: No. of Kinds	Bottom Organisms: No. Per Sq. Ft.	Dominant Forms	Indicated Water Quality
9	Antietam Creek at the Devils Backbone County Park adjacent to Maryland Route 68	16	56	Gill-breathing Snails, Air-breathing Snails	Mild Pollution
10	Beaver Creek (Tributary to Antietam Creek) near its mouth off Maryland Route 68 near Breathedsville, Maryland	24	324	Gill-breathing Snails, Riffle Beetles, Midge Larvae Caddisflies	Excellent
11	Little Antietam Creek (Tributary to Antietam Creek) at the bridge downstream from Keedysville, Maryland, and west of Route 34	27	1,458	Caddisflies Riffle Beetles Midge Larvae	Excellent
12	Antietam Creek at Burnside Bridge near Sharpsburg, Maryland	14	15	Midge Larvae	Mildly Degraded
13	Antietam Creek at the bridge at the Village of Antietam, Maryland	22	713	Midge Larvae Caddisflies Mayflies	Excellent

TABLE II

TABULATION OF BOTTOM ORGANISMS BY STATION ON ANTIETAM CREEK AND TRIBUTARIES--JULY 1966

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
1. West Branch of Antietam Creek off Pa. Rt. 316	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Malacostraca			
	Isopoda			
	Asellus sp.	x		
	Trichoptera			
	Hydropsyche sp.	x		
	Hirudinea			
	Erpobdella sp.	x		
	Gastropoda			
	Pulmonata			
	Heliosoma sp.	x		
	Ferrissia sp.	x		
	Coleoptera			
	Ectopria sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.	x		
2. Antietam Creek at Millers Church Road	Gastropoda			
	Pulmonata			
	Physa sp.		22	1.46
	Gyraulus sp.		8	0.53
	Prosobranchia			
	Amnicola sp.		6	0.40

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
2. Antietam Creek at Millers Church Road (Continued)	Hirudinea			
	Erpobdella sp.	x		
	Glossiphonia sp.	x		
	Helobdella sp.		1	0.07
	Malacostraca			
	Amphipoda			
	Gammarus sp.	x		
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Oligochaeta			
	Plesiopora			
	Tubifex sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		96	6.40
	Simulidae			
	Simulium sp.		1,368	91.14
	Total Number of Organisms Per Square Foot		1,501	
3. Antietam Creek	Hirudinea			
	Glossiphonia sp.	x		
	Malacostraca			
	Amphipoda			
	Gammarus sp.		63	5.72
	Isopoda			
	Asellus sp.		9	0.82
	Turbellaria			
	Tricladia			
	Dugesia sp.		10	0.91

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
3. Antietam Creek (Continued)	Gastropoda			
	Pulmonata			
	Gyraulus sp.		24	2.18
	Physa sp.		55	4.99
	Prosobranchia			
	Amnicola sp.		7	0.63
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		21	1.90
	Prosopora			
	Lumbriculidae		10	0.91
	Diptera			
	Simulidae			
	Simulium sp.		11	1.00
	Tendipedidae			
	Polypedilum sp.		356	32.30
	Trichoptera			
	Cheumatopsyche sp.		523	47.46
	Hydropsyche sp.	x		
	Coleoptera			
	Stenelmis sp.		13	1.18
	Total Number of Organisms Per Square Foot		1,102	
4. Antietam Creek at Trovinger Road	Malacostraca			
	Amphipoda			
	Gammarus sp.	x		
	Hyalella sp.	x		
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
4. Antietam Creek at Trovinger Road (Continued)	Gastropoda			
	Pulmonata			
	Physa sp.	x		
5. Marsh Run at Mouth	Malacostraca			
	Decapoda			
	Cambarus sp.		7	0.94
	Isopoda			
	Asellus sp.		80	10.76
	Gastropoda			
	Pulmonata			
	Ferrissia sp.	x		
	Physa sp.	x		
	Lymnaea sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		304	40.91
	Hydrobaenus sp.		8	1.08
	Coleoptera			
	Stenelmis sp.		104	14.00
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Ephemeroptera			
	Ameletus sp.	x		
	Tricorythodes sp.		8	1.08
	Trichoptera			
	Hydropsyche sp.		208	28.00
	Cheumatopsyche sp.		8	1.08

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
5. Marsh Run at Mouth (Continued)	Oligochaeta			
	Plesiopora			
	Tubifex sp.		16	2.15
	Total Number of Organisms Per Square Foot		743	
6. Antietam Creek at Antietam Drive	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Gastropoda			
	Pulmonata			
	Ferrissia sp.		7	19.44
	Lymnaea sp.		3	8.33
	Gyraulus sp.		1	2.78
	Trichoptera			
	Hydropsyche sp.		2	5.56
	Ephemeroptera			
	Baetis sp.	x		
	Coleoptera			
	Stenelmis sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		15	41.67
	Tipulidae			
	Tipula sp.		1	2.78
	Malacostraca			
	Amphipoda			
	Gammarus sp.	x		
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		7	19.44
	Total Number of Organisms Per Square Foot		36	

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
7. Antietam Creek	Gastropoda			
	Pulmonata			
	Physa sp.		112	3.28
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		1,824	53.40
	Diptera			
	Tendipedidae		1,176	34.43
	Diamesinae		48	1.40
	Polypedilum sp.			
	Tipulidae			
	Tipula sp.		256	7.49
	Total Number of Organisms Pre Square Foot		3,416	
8. Antietam Creek at Poffenberger Road	Gastropoda			
	Pulmonata			
	Gyraulus sp.	x		
	Physa sp.		88	22.34
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Hirudinea			
	Erpobdella sp.		40	10.15
	Turbellaria			
	Tricladia			
	Dugesia sp.		8	2.03

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
8. Antietam Creek at Poffenberger Road Bridge (Continued)	Oligochaeta			
	Plesiopora			
	Nais sp.		10	2.54
	Diptera			
	Tendipedidae			
	Polypedilum sp.		248	62.94
	Total Number of Organisms Per Square Foot		394	
9. Antietam Creek at Maryland Route 68	Gastropoda			
	Pulmonata			
	Physa sp.	x		
	Ferrissia sp.		11	19.64
	Gyraulus sp.		3	5.35
	Heliosoma sp.		5	8.93
	Prosobranchia			
	Lioplax sp.		30	53.57
	Trichoptera			
	Hydropsyche sp.		4	7.14
	Hirudinea			
	Glossiphonia sp.	x		
	Erpobdella sp.		1	1.79
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Diptera			
	Simulidae			
	Simulium sp.	x		
	Tendipedidae			
	Polypedilum sp.	x		
	Cryptochironomus sp.	x		
	Diamesinae		1	1.79

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
9. Antietam Creek at Maryland Route 68 (Continued)	Oligochaeta			
	Plesiopora			
	Tubifex sp.		1	1.79
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Total Number of Organisms Per Square Foot		56	
10. Beaver Creek near	Malacostraca			
	Isopoda			
	Asellus sp.	x		
	Amphipoda			
	Gammarus sp.		4	1.23
	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Coleoptera			
	Psephenus sp.		4	1.23
	Stenelmis sp.		63	19.45
	Gastropoda			
	Prosobranchia			
	Lioplax sp.		134	41.36
	Pulmonata			
	Physa sp.	x		
	Lymnaea sp.	x		
	Megaloptera			
	Sialis sp.		2	0.62
	Chauliodes sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
10. Beaver Creek near Mouth (Continued)	Trichoptera			
	Limnephilus sp.	x		
	Hydropsyche sp.	x		
	Wormaldia sp.	x		
	Heliocopsyche sp.		29	8.95
	Ephemeroptera			
	Isonychia sp.	x		
	Stenonema sp.		6	1.85
	Tricorythodes sp.		1	0.31
	Hexagenia bilineata	x		
	Ephemera sp.		1	0.31
	Paraleptophlebia sp.		1	0.31
	Pelecoptera			
	Acroneuria sp.	x		
	Diptera			
	Tendipedidae			
	Diamesinae		1	0.31
	Polypedilum sp.		56	17.28
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		22	6.79
	Total Number of Organisms Per Square Foot		324	
11. Little Antietam Creek	Malacostraca			
	Decapoda			
	Cambarus sp.		19	1.30
	Amphipoda			
	Gammarus sp.		6	0.41
	Isopoda			
	Asellus sp.		32	2.19

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
11. Little Antietam Creek (Continued)	Gastropoda			
	Prosobranchia			
	Liopiax sp.	x		
	Pulmonata			
	Ferrissia sp.	x		
	Gyraulus sp.	x		
	Physa sp.	x		
	Trichoptera			
	Cheumatopsyche sp.	x		
	Hydropsyche sp.		960	65.84
	Glossoma sp.		8	0.55
	Ephemeroptera			
	Baetis sp.		2	0.14
	Stenonema sp.		2	0.14
	Tricorythodes sp.		7	0.48
	Ameletus sp.	x		
	Odonata			
	Zygoptera			
	Enallagma sp.	x		
	Argia sp.	x		
	Anisoptera			
	Aeschna sp.	x		
	Plecoptera			
	Acroneuria sp.	x		
	Diptera		3	0.21
	Simulidae			
	Simulium sp.	x		
	Culicidae			
	Culex sp.	x		
	Tipulidae			
	Antocha sp.		40	2.74
	Tendipedidae			
	Diamesinae		102	7.00

TABLE II (Continued)

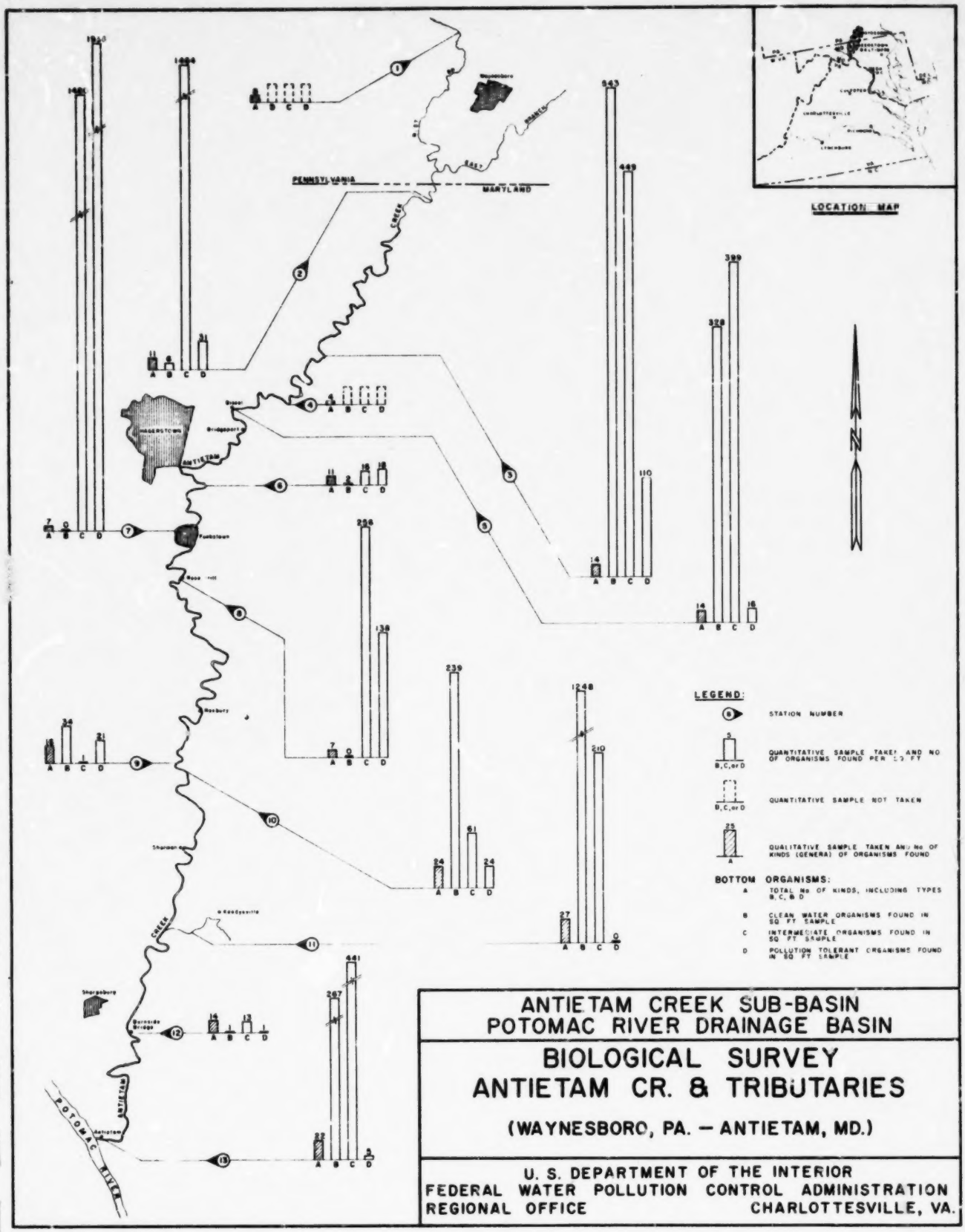
Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
11. Little Antietam Creek (Continued)	Turbellaria			
	Tricladia			
	Dugesia sp.		8	0.55
	Megaloptera			
	Chauliodes sp.		5	0.34
	Coleoptera			
	Psephenus sp.		24	1.65
	Stenelmis sp.		240	16.46
	Total Number of Organisms Per Square Foot		1,458	
12. Antietam Creek at Burnside Bridge	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Coleoptera			
	Stenelmis sp.		1	6.67
	Gastropoda			
	Pulmonata			
	Physa sp.	x		
	Gyraulus sp.	x		
	Prosobranchia			
	Lioplax sp.	x		
	Malacostraca			
	Amphipoda			
	Gammarus sp.		1	6.67
	Hirudinea			
	Glossiphonia sp.	x		
	Erpobdella sp.	x		
	Oligochaeta			
	Plesiopora			
	Tubifex sp.		1	6.67

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
12. Antietam Creek at Burnside Bridge (Continued)	Turbellaria			
	Tricladia			
	Dugesia sp.	x		
	Trichoptera			
	Hydropsyche sp.	x		
	Odonata			
	Zygoptera			
	Ischnura sp.	x		
	Enallagma sp.	x		
	Diptera			
	Tendipedidae			
	Polypedilum sp.		12	79.99
	Total Number of Organisms Per Square Foot		15	
13. Antietam Creek at Bridge in Antietam	Malacostraca			
	Decapoda			
	Cambarus sp.	x		
	Amphipoda			
	Gammarus sp.	x		
	Coleoptera			
	Psephenus sp.	x		
	Stenelmis sp.		8	1.12
	Gastropoda			
	Prosobranchia			
	Pleurocerca sp.		6	0.84
	Lioplax sp.		13	1.83
	Pulmonata			
	Gyraulus sp.		1	0.14
	Ferrissia sp.	x		
	Physa sp.	x		

TABLE II (Continued)

Station Number and Location	Macro-Invertebrates Present	Present Only In Qualitative Sample	Number of Each Organism in Square Foot Sample	Per Cent of Quantitative Sample
13. Antietam Creek at Bridge in Antietam	Pelecypoda			
	Sphaeriidae			
	Sphaerium sp.	x		
	Trichoptera			
	Macronemum sp.	x		
	Hydropsyche sp.		200	28.05
	Ephemeroptera			
	Ameletus sp.	x		
	Tricorythodes sp.		8	1.12
	Isonychia sp.		32	4.49
	Diptera			
	Simulidae			
	Simulium sp.	x		
	Tabanidae			
	Tabanus sp.	x		
	Tendipedidae			
	Polypedilum sp.		440	61.71
	Hirudinea			
	Helobdella sp.	x		
	Erpobdella sp.		3	0.42
	Turbellaria			
	Tricladia			
	Dugesia sp.		1	0.14
	Oligochaeta			
	Plesiopora			
	Lumbriculidae		1	0.14
	Total Number of Organisms Per Square Foot		713	



ANTIETAM CREEK SUB-BASIN
POTOMAC RIVER DRAINAGE BASIN

BIOLOGICAL SURVEY
ANTIETAM CR. & TRIBUTARIES

(WAYNESBORO, PA. – ANTIETAM, MD.)

U. S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
REGIONAL OFFICE CHARLOTTESVILLE, VA.